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Antimicrobial resistance in intensive poultry and milk production in South Africa: from historical data analysis to the monitoring of the use of antibiotics

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ABSTRACT

Objectives: The gross income generated by animal production industries in South Africa was estimated at R80.8 billion (US\$6.86 billion) for 2012. The contribution from poultry meat was R30 billion with an addition of R8 million from eggs. The milk industry contributed for R11 billion. These industries represent more than 50% of the contribution of animal products to the gross income. Regular diseases outbreaks impact negatively the growth and development of these livestock industries. The incidence of specific diseases within South Africa plays a decisive role in the selection of antimicrobials to be administered and judicious use of antimicrobials is paramount. Avian pathogenic *Escherichia coli* causes major losses in the poultry industry and became the predominant bacterial disease due to the increased intensive confinement housing. In addition *E. coli* infections are often secondary to viral disease. Standard practices currently employed in South Africa are to start prophylactic treatment to prevent secondary bacterial infection whenever a sanitary problem occurs in poultry. In commercial dairy herds, somatic cell count higher than 400 000 cells/ml leads also to the treatment of sub-clinical mastitis involving mainly *Staphylococcus aureus*.

Material and methods: Time series analysis on *E. coli* and *S. aureus* resistance over a period of 10 years in relation with antibiotics use were performed. Seasonal and geographical patterns were also highlighted for some specific antibiotics family using general linear mixed models.

Results: Various temporal trends have been highlighted according to the different antibiotics allowed us to better understand the farmers practices leading to these resistance. Seasonal and regional patterns may vary according to the antibiotics that could be related to climatic variation.

Conclusion: This better understanding of the trends and patterns of antimicrobial resistance in intensive farming in South Africa provided room for advising farmers practices on the monitoring of antibiotics but challenged also research in terms of antimicrobial resistance drivers.